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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN ONG, ROBERT JENNINGS, and GREGG STETSKO

Appeal 2010-010477
Application 10/559,595
Technology Center 1600

Before DEMETRA J. MILLS, FRANCISCO C. PRATS, and JEFFREY N. FREDMAN, *Administrative Patent Judges*.

FREDMAN, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

This is an appeal under 35 U.S.C. § 134 involving claims to a pharmaceutical composition. The Examiner rejected the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b). We affirm-in-part.

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" (paper delivery mode) or the "NOTIFICATION DATE" (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

Statement of the Case

The Specification teaches "the design of novel pharmaceutical compositions for the transmucosal delivery of bioactive peptides and proteins. The novel compositions of the invention may be used to effectively deliver bioactive peptides and proteins systemically to the blood subsequent to transmucosal administration" (Spec. 6, l. 30 – Spec. 7, l. 2).

The Claims

Claims 1-10 and 15-34 are on appeal. Claim 1 is representative, and the remaining claims have not been argued separately and therefore stand or fall together with claim 1. 37 C.F.R. § 41.37(c)(1)(vii). Claim 1 reads as follows:

> 1. A pharmaceutical composition for transmucosal administration of a bioactive peptide or protein of interest comprising said bioactive peptide or protein of interest, a cationic polyamino acid, and a compatible buffer, wherein at the pH of the composition said compatible buffer does not cause precipitation of the cationic polyamino acid, and has a mono-anionic or neutral net charge; and
>
> wherein the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition; and
>
> wherein the transmucosal absorption of said bioactive peptide or protein is increased relative the absorption of said bioactive peptide or protein in the absence of said cationic polyamino acid.

The issues

A. The Examiner rejected claims 1-10 and 15-34 under 35 U.S.C. § 112, second paragraph as indefinite (Ans. 11-13).

B. The Examiner rejected claim 1 under 35 U.S.C. § 102(b) as anticipated by Rothbard[2] (Ans. 4).

C. The Examiner rejected claims 1-4, 6, 7, 9, 10, 15, 16, and 18-21 under 35 U.S.C. § 102(a) and (e) as anticipated by Defelippis[3] (Ans. 4-5).

D. The Examiner rejected claims 1-10 and 15-26 under 35 U.S.C. § 103(a) as obvious over Young,[4] Baichwal,[5] and Ryser[6] (Ans. 6-11).

A. 35 U.S.C. § 112, second paragraph

The Examiner finds that it "is unclear how a bioactive peptide or protein of interest will have the same net charge as the cationic polyamino acid" (Ans. 11). The Examiner finds that "if the poly-arginine is a 13mer, this would give a net charge of +13. It is unclear how a bioactive peptide or protein, exendin-4, having a 39 amino acid would have a net charge of +13" (*id.*). The Examiner finds that the "sequence of exendin-4 is HGEGTFTSDLSKQMEEEAVRLFIEWLKNGGPSSGAPPPS. There are not enough positively charged amino acids (K, R and H) to get the same net charge of +13 as the cationic polyamino acid" (*id.* at 11-12).

Appellants contend that "Claim 1 recites that the bioactive peptide or protein of interest has the 'same net charge' as the cationic polyamino acid

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[2] Rothbard et al., US 2002/0009491 A1, published Jan. 24, 2002.
[3] Defelippis et al., WO 02/098348 A2, published Dec. 12, 2002.
[4] Young et al., US 2003/0087820 A1, published May 8, 2003.
[5] Baichwal, Anand R., US 5,330,761, issued Jul. 19, 1994.
[6] Ryser et al., US 4,847,240, issued Jul. 11, 1989.

at the pH of the composition. It appears that the rejection is not based on a proper interpretation of this claim term" (App. Br. 7). Appellants point to the Specification, which states "at the pH of the composition both the protein and the polyamino acid have a net positive charge. In this situation, it is not necessary that the magnitude of the charge be identical, but only that the net charge be the same" (Spec. 8, ll. 15-18).

Appellants contend that it "is clear that the claim language means that the protein or peptide and the polyamino acid both have a net positive charge or a net negative charge, and that the magnitude of that charge is not referred to in the claim" (Reply Br. 2).

The issue with respect to this rejection is: Does the evidence of record support the Examiner's conclusion that the phrase "wherein the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition" renders claim 1 indefinite?

Findings of Fact

1. The Specification teaches that "at the pH of the composition both the protein and the polyamino acid have a net positive charge. In this situation, it is not necessary that the magnitude of the charge be identical, but only that the net charge be the same" (Spec. 8, ll. 17-20).

Principles of Law

The test for definiteness under 35 U.S.C. § 112, second paragraph, is whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed. Cir. 1986).

Analysis

We agree with Appellants that the claims must be read in light of the Specification (*see* App. Br. 7). We also agree that the Specification makes clear that it is the "net charge" of the peptides and protein that must be the same, not the magnitude of that charge (FF 1). Additionally, we agree with Appellants that "as noted in the Examiner's Answer, the pI of exendin-4 is 5.3. Therefore, persons of ordinary skill in the art readily understand that at a pH of 4.5, exendin-4 will be positively charged" (Reply Br. 2).

We are therefore not persuaded by the Examiner's argument, which does not interpret the claim term "same net charge" in light of the Specification, as required.

Conclusion of Law

The evidence of record does not support the Examiner's conclusion that the phrase "wherein the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition" renders claim 1 indefinite.

B. 35 U.S.C. § 102(b) over Rothbard

The Examiner finds that "Rothbard et al teach a pharmaceutical composition comprising components (delivery-enhancing transporter (poly-arginine) and biologically active agents (such as peptide or protein)) in a suitable medium, such as water or a buffered aqueous solution" (Ans. 4). The Examiner finds that since "the bioactive peptide and cationic polyamino acid are formed in water or aqueous buffer, this would inherently have the functionality and the characteristics of the instantly claimed invention" (*id.*).

Appellants contend that "Rothbard does not disclose or suggest a composition where the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition" (App. Br. 8). Appellants contend that

> Rothbard explains at paragraph 44 (and 45) that the components of the composition (delivery-enhancing transporters such as poly-Arg (paragraph 48), and the biologically active agent (paragraph 26)) "are held in an ionic association, typically viewed as an ion pair." Thus, these components of an ion pair necessarily have opposite net charges at the pH of the composition, one net positive and the other net negative.

(*Id.*)

The issue with respect to this rejection is: Does the evidence of record support the Examiner's conclusion that Rothbard anticipates claim 1?

Findings of Fact

2. Rothbard teaches that therapeutic agents "refer, without limitation, to any composition that can be used to the benefit of a mammalian species. Such agents may take the form of ions, small organic molecules, peptides, proteins or polypeptides" (Rothbard 2 ¶ 0026).

3. Rothbard teaches that "delivery enhancing transporters are poly-Arg transporters consisting of heptamers, octamers, nonamers and the like of arginine. Similarly, polymers of homoarginine are useful" (Rothbard 4 ¶ 0048).

4. Rothbard teaches that the compositions "can be prepared by combining the components (delivery-enhancing transporter and biologically active agents) in a suitable medium and concentrating the composition to

dryness. In many embodiments, the compositions are formed in water or a buffered aqueous solution, lyophilized and packaged for reconstitution and use by the clinician" (Rothbard 9 ¶ 0123).

5. Rothbard teaches that "[r]ather than a covalent composition, the components are held in an ionic association, typically viewed as an ion pair. Despite the term 'ion pair,' the invention will, in some embodiments, include compositions of one or more biologically active agents in association with one delivery-enhancing transporter" (Rothbard 4 ¶ 0044)

6. Rothbard teaches that "[e]ach of the composition components will posses an ionic charge at physiologic pH. More particularly, the transporter will be positively charged and the biologically active agent will be negatively charged" (Rothbard 4 ¶ 0045).

Principles of Law

"Inherency … may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." *MEHL/Biophile Int'l. Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)).

Analysis

The Examiner argues that Rothbard inherently teaches the claim limitation that "the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition" (*see* Ans. 4).

We are not persuaded. Rothbard teaches that the "components are held in an ionic association, typically viewed as an ion pair" (Rothbard 4 ¶

0044; FF 5). Rothbard further explains that "[e]ach of the composition components will posses an ionic charge at physiologic pH. More particularly, the transporter will be positively charged and the biologically active agent will be negatively charged" (Rothbard 4 ¶ 0045; FF 6). The only reasonable interpretation of these teachings of Rothbard is that the transporter and biologically active agent will not have the same net charge (FF 5-6).

Conclusion of Law

The evidence of record does not support the Examiner's conclusion that Rothbard anticipates claim 1.

C. 35 U.S.C. § 102(a) and (e) over Defelippis

The Examiner finds that "Defelippis teaches a composition comprising a GLP-1 compound and a basic polypeptide (see claim 1). Defelippis specifically teaches the use of exendin-4 (see claim 8, page 12, lines 6-21) as the GLP-1 compound. Defelippis teaches polyarginine as the basic polypeptide (see claim 13)" (Ans. 4). The Examiner finds that "Defelippis teaches that the composition is in a buffered solution . . . Defelippis teaches the use of a zinc solution at pH of between about 5 and about 6 (see page 29, lines 29-32) and also teaches pH adjustments to less than 5" (*id.*).

The Examiner finds that "[s]ince the reference teaches the composition comprising poly-arginine peptide, exendin-4, and buffer at pH of the instant claims, the composition would inherently have the same functionality and characteristics as the instant composition" (*id.* at 5).

Appellants contend that the "present claims recite that the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition" (App. Br. 9). Appellants contend that the "disclosure of Defelippis makes it clear that the bioactive peptide or protein of interest and the cationic polyamino acid disclosed have opposite charges, and cannot have the same net charge" (*id.*).

Appellants also contend that the "present claims recite that the pharmaceutical composition has a pH at which the compatible buffer does not cause precipitation of the cationic polyamino acid. Defelippis discloses a composition at a pH where the GLP-1 and polyamino acid is precipitated, since it is disclosed as being in particle form" (*id.* at 10).

The issue with respect to this rejection is: Does the evidence of record support the Examiner's conclusion that Defelippis anticipates claim 1?

Findings of Fact

7. Defelippis teaches that the "present invention encompasses particles formed from a GLP-1 compound and a basic polypeptide added together at a ratio between about 4: 1 and about 10: 1" (Defelippis 24, ll. 23-25).

8. Defelippis teaches that "[a]mino acids 38-45 of an extended GLP-1 compound are preferably the same as or a conservative substitution of the amino acid at the corresponding position of Exendin-3 or Exendin-4" (Defelippis 12, ll. 3-6).

9. Defelippis teaches that the "basic polypeptide is selected from the group consisting of polyarginine, protamine" (Defelippis 8, ll. 1-2).

10. Defelippis teaches that the "particles of the present invention are prepared by mixing a buffered GLP-1 compound solution with a buffered basic polypeptide solution" (Defelippis 27, ll. 18-20).

11. Defelippis teaches that

> Alternatively the suspension can be manipulated to form a solution which can then be administered as an injectable composition or as an aerosol or spray-dried to a dry powder composition of particles. If a solution is desired, the suspension of particles can be dissolved by adjusting the pH of the suspension. Typically the pH is decreased until the particles dissolve. Generally, adjustment of the pH to less than 6 will result in dissolution of the particles. More preferred is a pH of less than 5. Most preferred is a pH less than 4. The result is a solution formulation that precipitates upon administration.

(Defelippis 31, ll. 7-16.)

12. Defelippis teaches, in Example 24, the dissolution of particles, specifically teaching that "[o]ne part Val^8-GLP-1 (7-37) OH solution was combined with one part protamine solution. A precipitate formed and the pH was adjusted to 4.0. The result was a clear solution" (Defelippis 55, ll. 13-15).

13. Defelippis teaches that:

> A glycine solution was prepared by dissolving glycine in sterile water to achieve a final concentration of 1M. 8 mLs of the glycine solution was combined with 4 mLs of Val^8- GLP-1 (7-37) OH solution prepared as described in example 24 and 20 mLs of protamine solution prepared as described in example 24. The final concentration of glycine was 100mM and the final concentration of Val^8-GLP-1 (7-37) OH was about 1 mg/mL. The resulting pH of the mixture was 6.6. Precipitates formed immediately upon

> mixing. The pH was adjusted to 4.2 with 5N HCl resulting in a clear solution.

(Defelippis 55, l. 19 to 56, l. 4.)

Analysis

Defelippis teaches pharmaceutical compositions which may comprise exendin-4 (FF 8) and that the "basic polypeptide is selected from the group consisting of polyarginine, protamine" (Defelippis 8, ll. 1-2; FF 9). Defelippis teaches that

> If a solution is desired, the suspension of particles can be dissolved by adjusting the pH of the suspension. Typically the pH is decreased until the particles dissolve. Generally, adjustment of the pH to less than 6 will result in dissolution of the particles. More preferred is a pH of less than 5. Most preferred is a pH less than 4. The result is a solution formulation that precipitates upon administration.

(Defelippis 31, ll. 7-16; FF 11.)

The Examiner finds that "[s]ince the reference teaches the composition comprising poly-arginine peptide, exendin-4, and buffer at pH of the instant claims, the composition would inherently have the same functionality and characteristics as the instant composition" (Ans. 5).

We agree with the Examiner. The composition taught by Defelippis is a mixture of an exendin-4 bioactive protein and polyarginine compound at pH 4, at which pH Defelippis teaches the particles will not precipitate (FF 8-11). Consistent with Appellants' own claims, where the preferred pH is between 4 and 5 (*see* Claim 3), a preferred cationic polyamino acid is polyarginine (*see* Claim 7) and a preferred bioactive peptide is exendin-4 (*see* Claim 10), the Examiner has reasonably provided evidence supporting

the inherent identity of the composition of Defelippis with the composition being claimed, thereby shifting the burden to Appellant to prove that the prior art product does not necessarily or inherently possess the characteristics of the claimed product. *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1977) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product.").

Appellants contend that the "present claims recite that the bioactive peptide or protein of interest has the same net charge as the cationic polyamino acid at the pH of the composition" (App. Br. 9). Appellants contend that the "disclosure of Defelippis makes it clear that the bioactive peptide or protein of interest and the cationic polyamino acid disclosed have opposite charges, and cannot have the same net charge" (*id.*).

We are not persuaded. The net charge depends, as Appellants note in response to the indefiniteness rejection, upon the pI of the molecule (*see* App. Br. 8). Appellants teach that the pI of exendin-4 is 5.3, so it will have a positive charge at pH 4, the preferred pH of Defelippis (FF 11).

Appellants also contend that the "present claims recite that the pharmaceutical composition has a pH at which the compatible buffer does not cause precipitation of the cationic polyamino acid. Defelippis discloses a composition at a pH where the GLP-1 and polyamino acid is precipitated, since it is disclosed as being in particle form" (App. Br. 10).

We are not persuaded. While Appellants are correct that Example 4 demonstrates a situation where the GLP-1 and polyamino acid were precipitated, Examples 24 and 25 of Defelippis demonstrate situations where the precipitated GLP and polyamino acid solutions were pH adjusted to pH 4.0 and the precipitate dissolved (FF 12-13). That is, Defelippis teaches compositions of GLP-1 and polyamino acids at pH 4.0 where the polyamino acid is not precipitated and at a pH where the GLP and polyamino acid will have the same net charge (FF 12-13), inherently satisfying the requirements of Claim 1.

Conclusion of Law

The evidence of record supports the Examiner's conclusion that Defelippis anticipates claim 1.

D. 35 U.S.C. § 103(a) over Young, Baichwal, and Ryser

The Examiner finds that "Young discloses a pharmaceutical composition for using exendin-4 for transmucosal administration (see paragraph [0188]) using an acetate/glutamate buffer (comprises acetic acid/glutamic acid), with a pH in the range of 3-7" (Ans. 7). The Examiner finds that "Baichwal AR teaches that a bioadhesive controlled-release solid dosage forms adhere to mucosa" (*id.*). The Examiner finds that "Ryser teaches that cationic polypeptides, and in particular polyarginine effect or enhance cellular uptake of molecules which are either excluded from or are poorly taken up by cells" (*id.* at 8).

The Examiner finds it obvious to "combine the teachings of Young, Baichwal and Ryser for the express benefits for enhancing cellular uptake of polypeptide hormones across membranes, for controlled release, and for the

adhesion of the bioactive agents to the mucosa of the patient population" (Ans. 9).

Appellants contend that "Young functions according to a principle of utilizing a formulation to provide exendins to the blood plasma. Baichwal functions according to a principle of providing a solid tablet that is compressible (Col. 3, lines 21-24) and that is not absorbed into the body, but rather provides a localized effect" (App. Br. 12). Appellants contend that "modifying Young according to Baichwal changes the principle of operation of Young, and the two references are not properly combinable" (*id.*). Appellants contend that "Ryser is not combinable with Young either, because no motivation exists for doing so" (*id.*).

Appellants contend that "Ryser is not relevant to the present invention, which recites a composition for transmucosal administration of a bioactive peptide or protein . . . This is distinct from merely achieving a cellular uptake of a molecule as in Ryser" (*id.* at 12-13). Appellants also contend that "Ryser is not properly combinable with Young for the additional reason that combining Ryser with Young changes the principle of operation of Young" (*id.*).

The issue with respect to this rejection is: Does the evidence of record support the Examiner's conclusion that Young, Baichwal, and Ryser render claim 1 obvious?

Findings of Fact

14. Young teaches that "[e]xendins, exendin agonists and antagonists, exendin analogs, formulations and dosages of the invention are useful in view of their exendin-like or anti-exendin effects . . . Also

described herein are formulations and dosages useful in alternative delivery routes, including . . . transmucosal" (Young 7 ¶ 0188).

15. Young teaches that for

> compounds having exendin-4-like potency, these dosage forms preferably include approximately 0.005 to about 5% . . . of the active ingredient in an aqueous system along with approximately 0.02 to 0.5% (w/v) of an acetate, phosphate, citrate or glutamate or similar buffer either alone or in combination to obtain a pH of the final composition of approximately 3.0 to 7.0, more specifically from about pH 4.0 to about 6.0, or from about 4.0 to 5.0

(Young 9 ¶ 0203).

16. Young teaches that "[p]assage of exendin-4 has been investigated across several surfaces, the respiratory tract (nasal, tracheal, and pulmonary routes) and the gut (sublingual, gavage and intraduodenal routes). Biological effect and appearance of exendin-4 in blood have been observed with each route of administration via the respiratory tract" (Young 12 ¶ 0232).

17. Baichwal teaches "a controlled release bioadhesive tablet which includes a locally active agent, a heterodisperse gum matrix, and a pharmaceutically acceptable diluent. . . . The final product adheres to mucous membranes and releases the locally active agent over a desired period of time" (Baichwal abstract).

18. Ryser teaches that "many molecules of a wide variety are not transported, or are poorly transported, into living cells. Macromolecules, for example, such as proteins, nucleic acids, and polysaccharides, are not suited

for diffusion or active transport through cell membranes simply because of their size" (Ryser, col. 1, ll. 22-27).

19. Ryser teaches that "it was found that cellular uptake of some molecules could be improved by the simple presence in the experimental medium of such cationic polymers, especially homopolymers of positively charged amino acids such as poly-L-lysines, poly-D-lysines and poly-L-ornithines" (Ryser, col. 1, ll. 51-56).

20. Ryser teaches that this "method can be used to enhance cellular uptake of macromolecules which normally are not effectively transported into cells. These macromolecules include proteins, such as enzymes, growth factors or other regulatory proteins, peptides, polypeptide hormones" (Ryser, col. 4, ll. 12-16).

21. Ryser teaches that "[s]pecific poly(amino acids) which are suitable include, but are not limited to . . . poly-L-arginine" (Ryser, col. 6, ll. 54-56).

Principles of Law

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). "If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability." *Id.* at 417.

Analysis

Young teaches that for

> compounds having exendin-4-like potency, these dosage forms preferably include approximately 0.005 to about 5% . . . of the active ingredient in an aqueous system along with

> approximately 0.02 to 0.5% (w/v) of an acetate, phosphate, citrate or glutamate or similar buffer either alone or in combination to obtain a pH of the final composition of approximately 3.0 to 7.0, more specifically from about pH 4.0 to about 6.0, or from about 4.0 to 5.0

(Young 9 ¶ 0203; FF 15).

Ryser teaches that "it was found that cellular uptake of some molecules could be improved by the simple presence in the experimental medium of such cationic polymers, especially homopolymers of positively charged amino acids such as poly-L-lysines, poly-D-lysines and poly-L-ornithines" (Ryser, col. 1, ll. 51-56; FF 19). Ryser teaches that "[s]pecific poly(amino acids) which are suitable include, but are not limited to . . . poly-L-arginine" (Ryser, col. 6, ll. 54-56; FF 21).

Applying the *KSR* standard of obviousness to the findings of fact, we agree with the Examiner that it would have been obvious to add a cationic polymer as taught by Ryser to the exendin-4 compound of Young since Ryser teaches that this "method can be used to enhance cellular uptake of macromolecules which normally are not effectively transported into cells. These macromolecules include proteins, such as enzymes, growth factors or other regulatory proteins, peptides, polypeptide hormones" (Ryser, col. 4, ll. 12-16; FF 20). Such a combination is merely a "predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417.

Appellants contend that "Ryser is not combinable with Young either, because no motivation exists for doing so" (App. Br. 12). Appellants contend that "Ryser is not relevant to the present invention, which recites a composition for transmucosal administration of a bioactive peptide or

protein . . . This is distinct from merely achieving a cellular uptake of a molecule as in Ryser" (App. Br. 12-13; *see also* Reply Br. 6). The Examiner responds that, "since Young teaches a transmucosal administration, one of ordinary skill in the art would have been motivated to combine the teachings of Young and Ryser for enhancing the cellular uptake of the therapeutic agent via transmucosal administration" (Ans. 21).

We agree with the Examiner that an ordinary artisan would have reasoned that Ryser's technique for increasing cellular drug uptake would be advantageous in transmucosal drug delivery methods, given that the epithelial cells in the mucosa would be expected to increase their uptake of the peptide drug, based on Ryser's teachings (FF 20). While it might be true that Appellants' purpose for forming the claimed composition is different than the reason suggested by Young and Ryser, that fact does not undermine the Examiner's prima facie case. *See KSR*, 550 U.S. at 419 ("In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103.").

Appellants also contend that "Ryser is not properly combinable with Young for the additional reason that combining Ryser with Young changes the principle of operation of Young" (App. Br. 13).

We are not persuaded. Young teaches that "[p]assage of exendin-4 has been investigated across several surfaces, the respiratory tract (nasal, tracheal, and pulmonary routes) and the gut (sublingual, gavage and intraduodenal routes). Biological effect and appearance of exendin-4 in

blood have been observed with each route of administration via the respiratory tract" (Young 12 ¶ 0232; FF 16). Each of the transmucosal routes of Young requires entry into cells in order for the exendin-4 compound to reach the blood and plasma, and Ryser teaches that the use of cationic peptides assists in cellular entry (FF 20). Thus, Ryser is consistent with the principle of operation of Young (FF 16, 20).

Conclusion of Law

The evidence of record supports the Examiner's conclusion that Young, Baichwal, and Ryser render claim 1 obvious.

SUMMARY

In summary, we reverse the rejection of claims 1-10 and 15-34 under 35 U.S.C. § 112, second paragraph as indefinite.

We reverse the rejection of claim 1 under 35 U.S.C. § 102(b) as anticipated by Rothbard.

We affirm the rejection of claim 1 under 35 U.S.C. § 102(a) and (e) as anticipated by Defelippis. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006), we also affirm the rejection of claims 2-4, 6, 7, 9, 10, 15, 16, and 18-21, as these claims were not argued separately.

We affirm the rejection of claim 1 under 35 U.S.C. § 103(a) as obvious over Young, Baichwal, and Ryser. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006), we also affirm the rejection of claims 2-10 and 15-26, as these claims were not argued separately.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED-IN-PART

cdc

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